

REMARKS

Claims 1-12 are pending in this application. By this Office Action, claims 1-5 are rejected under 35 U.S.C. §102(b), and claims 6-12 are rejected under 35 U.S.C. §103(a). By this Amendment, claims 1 and 6 are amended. Support for the amendments to claim 1 and 6 can be found in the specification, as filed, for example, at page 3, lines 28-37, and page 4, lines 1-18. No new matter is added.

I. Rejection Under 35 U.S.C. §102(b)

Claims 1-5 are rejected under 35 U.S.C. §102(b) as being anticipated by Nawa et al. (U.S. Patent No. 5,863,850; hereinafter "Nawa"). Applicant respectfully traverses this rejection.

The Office Action asserts that Nawa teaches a process for making a zirconia based ceramic material comprising the mixed oxide of cerium, titanium and zirconium, wherein an aqueous solution of zirconium and cerium salts is mixed with an organic solution of an alkoxide of titanium to obtain a mixed solution; and wherein the mixed solution is hydrolyzed to generate a precipitate and then heated at a temperature of 800° C. The Office Action also asserts that Nawa discloses "a water-in-oil emulsion system or microemulsion system is used due to the explanation that mixing an organic phase with an aqueous phase will necessarily result in a water-in-oil type emulsion or microemulsion." Finally, the Office Action asserts that Nawa inherently teaches an aqueous phase of the water-in-oil type microemulsion having a 2-40 nm particle size.

Independent claim 1 has been amended to more fully clarify that the process for production of a compound oxide involves "an aqueous phase containing a second element as an ion, *in a form of a microemulsion containing a surfactant*, in which a product of the hydroxide of the first element is produced by a hydrolysis reaction..." at least these limitations are not disclosed in Nawa.

Nawa describes in col. 6, lines 40-44 or in claim 8, that an aqueous solution including zirconium and cerium salts is mixed with an organic solution of an alkoxide; the mixed solution is hydrolyzed by adding an alkali aqueous solution, thereby generating a precipitate; and from the precipitate, a powder of the partially stabilized zirconia is obtained.

However, Nawa nowhere discloses a *microemulsion*. An emulsion system and a microemulsion system are different systems. An emulsion is thermodynamically unstable; the mixing and preparing steps should be controlled, and the phase separation should be prevented. In contrast, a microemulsion system is thermodynamically stable, and may be formed irrespective of the mixing and preparing methods, so long as certain conditions, such as the composition, the temperature, and the like are satisfied. As a result, the particle size of a microemulsion system is very fine as compared with an emulsion system. For example, particles in a microemulsion may measure a few nanometers to a few tens of nanometers, whereas particles in an emulsion system may measure 1 micrometer or more.

In Nawa, the object is to form bulk ceramics in which only coarse particles are formed. Nawa discloses particles having a size of nearly a micron, which does not allow uniform atomic level alignment in the particles of a compound oxide. Fine metal compound oxide particles having a composition uniform in the atomic level cannot be obtained in Nawa.

In the claimed invention, however, a *microemulsion* is essential to achieving the object of the invention, i.e. fine metal compound oxide particles having a composition uniform at the atomic level. A microemulsion contains the small particle size (i.e., from several nanometers to several tens of nanometers) by which uniform atomic level alignment can be attained.

For at least these reasons, Nawa does not anticipate the claimed invention. Reconsideration and withdrawal of the rejection are respectfully requested.

II. Rejections Under 35 U.S.C. §103

Claim 6 is rejected under 35 U.S.C. §103(a) as being unpatentable over Nawa in view of Sherif (U.S. Patent No. 5,023,371; hereinafter "Sherif"), and claims 7-12 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nawa in view of Sherif and Uenishi et al. (U.S. 20020061816; hereinafter "Uenishi"). Claims 1 and 6 are hereby amended. Applicant respectfully traverses the rejections with respect to the amended claims.

A. Claim 6

The Office Action asserts that Nawa fails to teach "wherein said organic phase having dissolved therein a zirconium alkoxide, wherein conducting said organic phase with said aqueous phase to produce a product of zirconium hydroxide by hydrolysis reaction of the zirconium alkoxide at their interface between said organic and aqueous phases while incorporating the zirconium element in the product"; however, Sherif teaches "a process for the formation of metal oxides from the correspond metal alkoxide by hydrolysis reaction wherein the process of initiating the hydrolysis of an alkoxide to form a metal oxide is applicable to alkoxides of titanium or zirconium for the purpose of forming metal oxide powders having better flow and density." Thus, it would allegedly have been obvious for an ordinarily skilled artisan to provide the process of initiating the hydrolysis of an alkoxide to form a metal oxide for the purpose of forming a metal oxide powders having better flow and density such that zirconium alkoxide is substituted for titanium alkoxide as taught by Sherif. Applicant disagrees.

The objective of the claimed invention is to provide a process for producing compound oxides having multiple elements that are homogenously mixed at the atomic level.

A person skilled in the art would not look from Nawa to Sherif in order to derive a solution to this objective, because Sherif aims to solve a different problem, namely, to only generally produce metal oxide powders useful in ceramics applications. The difference

between processes is clear in that Sherif produces different particle size, particle crystallinity, cation stoichiometry and powder surface area. See Sherif, col. 2, lines 53-68. Therefore, the solution offered in the claimed invention would not have been obvious to a person skilled in the art by looking from Nawa to Sherif, nor is there any suggestion or motivation to combine Nawa and Sherif to solve the problem addressed by the claimed invention.

For at least this reason, Nawa in view of Sherif would not have rendered obvious the claimed invention. Reconsideration and withdrawal of the rejection is respectfully requested.

B. Claims 7-12

The Office Action asserts that Nawa teaches the process as described in claim 1 of the claimed invention, and that Nawa and Sherif teach an exhaust gas purification catalyst carrier by a production process such that the characteristic of the product are inherently taught. Further, the Office Action asserts that Uenishi teaches a process for purifying exhaust wherein a mixed oxide comprising zirconium and cerium are used as catalysts. Applicant disagrees.

An ordinarily skilled artisan could find in Nawa a process for preparing crystalline mixed metal oxides of the general formula ABO_3 , wherein A is a divalent metal ion, and B is a quadrivalent ion, wherein the process comprises the steps of mixing a B containing organometallic compound with a solution (either aqueous or non-aqueous) of an A containing compound by jet mill mixing. However, the jet mill mixing in Nawa provides an emulsion system.

In contrast, as described above, the claimed invention achieves its objective by contacting an organic phase having dissolved therein an organic compound which produces a hydroxide of a first element when hydrolyzed, with an aqueous phase containing a second element as an ion, in a form of a *microemulsion* containing a surfactant, in which a product of the hydroxide of the first element is produced by a hydrolysis reaction of the organic

compound at their interface between said organic and aqueous phases while incorporating the second element in the product. As discussed above, the microemulsion system in the claimed invention is different from and would not have been obvious over the emulsion system of Nawa, and thus obviates the rejections of claims 1 and 6. Because Uenishi relates to a novel gas catalyst, and does not involve or address microemulsion, claims 7-12 would not have been obvious over Uenishi as viewed from Nawa and Sherif. Further, for the reasons cited, there exists no suggestion or motivation to combine Nawa, Sherif and Uenishi because they do not solve the problem or produce the same results as the claimed invention.

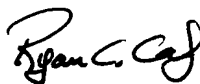
For at least this reason, Nawa in view of Sherif in view of Uenishi et al. would not have rendered obvious the claimed invention. Reconsideration and withdrawal of the rejection is respectfully requested.

III. Conclusion

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Favorable reconsideration and prompt allowance of the application is respectfully requested.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Attachment:

Petition for Extension of Time

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